

Community Resilience and the Role Played by Critical Infrastructure

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Abstract— Although numerous definitions exist for resiliency in the literature, for the purposes of this effort we will define resiliency as “the ability of an entity—e.g., asset, organization, community, region—to anticipate, resist, absorb, respond to, adapt to, and recover from, a disturbance from either natural or manmade events.” Resiliency can be measured for the individual elements that make up a community or region, but in order to measure the resiliency of the community or region, the synergistic relationships between all of the elements that make up the community must be examined.

The Rockefeller Foundation has begun an effort called “100 Resilient Cities Centennial Challenge”. Begun in 2013, the goal is to enable 100 cities to better address “the shocks and stresses of the 21st Century”. The first set of 32 cities to become members in the 100 Resilient Cities Network were identified in December 2013 and cover six continents (the Americas, Africa, Asia, Europe, and Oceania.)

In this Position Paper, we will first discuss the high-level characteristics that define a resilient community. Then, we will discuss the role that critical infrastructure plays in making a community more resilient. Finally, we will discuss how the results can be used to support the Rockefeller Foundation grand challenge.

Introduction - Building strong, resilient communities is critical to ensuring that communities can respond to the inevitable perturbative effects of threats facing them, whether natural or man-made. The literature on resiliency contains several ways to characterize a resilient community; Figure 1 shows the characteristics that we are using for the purposes of this paper. *Sustainability* represents the capacity of a community to continuously meet their basic needs. *Social responsibility* is the community’s desire to improve beyond the basic needs and *social opportunity* represents having that ability to provide the services and functionality that do improve the quality of life beyond the basic needs. Finally, a *secure environment* is what provides the conditions that insure that the bettering of the quality of life can be maintained.

Critical infrastructure plays an important role in making a community resilient, but it is not the only contributing element. Figure 2 shows a schematic

representation of other key elements that play contributing roles. These elements have a web of interconnections between them that can result in disruptions in one element being manifested in others. These feedback relationships can result in the requirement that in order to strengthen one community element, for example the electrical infrastructure, changes may be required in other elements in addition to the originally targeted electrical infrastructure.

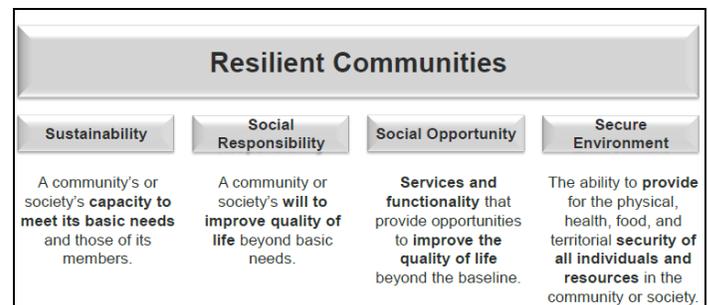


Fig 1. The Characteristics of a Resilient Community.



Fig. 2. Linked Elements that Contribute to a Resilient Community.

In this Position Paper, we will address two primary matters. First, we will propose how to identify the way in which critical infrastructures, through a complex set of interconnectedness and feedback processes, have the potential to help or hinder the capability of the community to be resilient. Second, we will explore assessment approaches used

to identify the aspects of resilient communities—and the contribution of critical infrastructure as a context driven entity. That is, each resiliency analysis must take into account the unique aspects and impacts of each community and region in which it is conducted (i.e., no “one-size-fits-all” solutions).

Lastly, we will discuss how these results could be used to support the Rockefeller Foundation grand challenge.

Keywords—Resiliency, community, critical infrastructure